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(58) Field of search

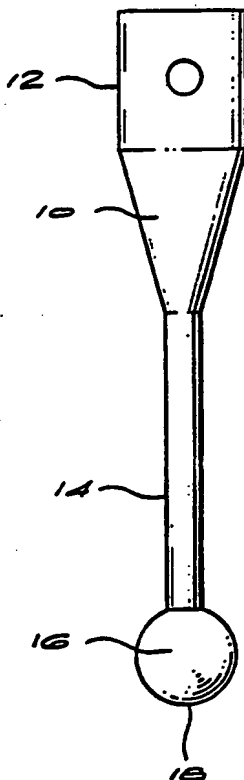
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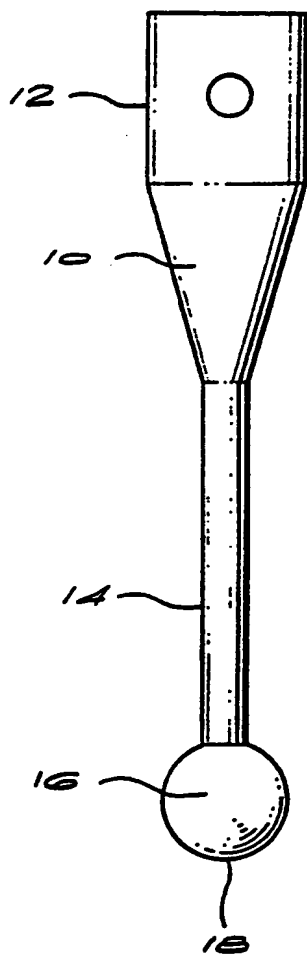
(54) **Probes**

(57) A probe for a co-ordinate measuring machine or a tool-setting piece which has a stylus made of a material selected from diamond, cubic boron nitride, polycrystalline diamond and polycrystalline cubic boron nitride.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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PROBESBACKGROUND OF THE INVENTION

This invention relates to probes and more particularly to probes for a co-ordinate measuring machine or for a tool-setting piece.

In high precision lathing and similar operations, it is important that the tool is set with a high degree of precision to avoid excess cutting or unnecessary scrap being produced. Increasingly, industry is using co-ordinate machines with high precision probing systems to achieve accurate tool settings and dimensional measurement of large components. A crucial component in such machines is the stylus which is that part of the system which makes contact of the component causing the probe into which the stylus is directly mounted to produce a trigger signal. The type and size of stylus used is dictated by the feature to be inspected. The stylus should have maximum rigidity and sphericity. At present, the styli are generally made of ruby, white ceramic sintered alumina, silver steel or the like.

SUMMARY OF THE INVENTION

According to the present invention, the stylus of a probe for a co-ordinate measuring machine or a tool-setting piece is made of a material selected from diamond, cubic boron nitride, polycrystalline diamond, and polycrystalline cubic boron nitride.

DESCRIPTION OF THE DRAWING

The drawing illustrates a perspective view of an embodiment of a probe of the invention.

DESCRIPTION OF EMBODIMENTS

The stylus of the probe is made of a material which is harder and more wear-resistant than the conventionally used materials. Thus, greater precision and accuracy can be achieved over a longer period of time. Further, particularly for diamond and polycrystalline diamond, the materials from which the styli are made have a low thermal expansion thereby minimising the risk of the stylus losing its shape when being mounted in the probe.

The stylus is preferably made of diamond which may be synthetic or natural. The stylus may also be made of polycrystalline diamond such as that sold under the trade names Syndite® and Syndax®. Such polycrystalline diamond will be rendered

smooth and spherical by methods known in the art. The polycrystalline diamond or cubic boron nitride may be bonded to a cemented carbide support. Bonding to the stem of the probe will be through this support.

The stylus may also be made of cubic boron nitride or polycrystalline cubic boron nitride. An example of a suitable polycrystalline cubic boron nitride is that sold under the trade name Amborite®. Such polycrystalline cubic boron nitride will be rendered smooth and spherical by methods known in the art.

The stylus will be mounted on the probe and will be secured thereto mechanically or by means of a suitable braze.

The stylus may be of the simple ball type or of the star type offering a multiple tip probing capability. A star stylus will typically have five stems mounted rigidly on a carrier, each stem carrying at its end a stylus of the invention. The styli of this type are used in co-ordinate measuring machines.

For tool-setting pieces, the stylus will generally have a square or rectangular shape.

An embodiment of the invention will now be described with reference to the accompanying drawing. Referring to this drawing, a probe for a co-ordinate

measuring machine comprises a stem 10 one end 12 of which is adapted to be connected to the machine, and the other end 14 of which has mounted thereon a stylus 16. The stylus 16 consists of a spherical diamond which has a hole formed therein and into which the end 14 fits. The diamond is bonded to the end 14 by means of a suitable braze.

The probe is mounted in the co-ordinate measuring machine and used in the conventional manner with the leading end 18 of the diamond making contact with the workpiece or component. Diamond is extremely hard and wear-resistant enabling it to be used over a much longer period than, for example, a ruby and also on very hard materials without distortion of its own shape. Further, the low thermal expansion of the diamond enables it to be brazed on to the end 14 of the probe without any significant distortion of its spherical shape taking place.

For a tool-setting piece, the stylus 16 will have a square shape.

CLAIMS

1.

A probe for a co-ordinate measuring machine or a tool-setting piece which has a stylus made of a material selected from diamond, cubic boron nitride, polycrystalline diamond and polycrystalline cubic boron nitride.

2.

A probe according to claim 1 and substantially as herein described with reference to the accompanying drawing.